Agile Project Management in Large Scale Software Development

Sheikh Muhammad Ali

Master Thesis

Department of Informatics

UNIVERSITETET I OSLO

February. 2020

1

Abstract

The popularity of software development using agile methodologies have increased since the formulation of agile manifesto in 2001. Several factors, like the collaboration with customer and other stakeholders, welcoming change request, and changing business requirement through the development life cycle enables the software companies to work productively and reduces the risk of software failure. Agile methodologies were introduced for small-scaled projects, but with the increase in use and its successful outcomes, there comes a need to adopt this for large-scaled applications development involving various teams, stakeholders and customers.

Managing a project with a limited scope is easier, but when it comes to large-scale enterprise applications involving extensive modules, having diffuse scope, different niche, integrations etc., not only increases the complexity of the project but also becomes a challenge for managers to manage the project complexity. To ensure that the development process goes efficiently and smoothly, reducing the risk of failures is essential.

In this thesis, we have addressed the problem of communication and trust issues in project management. The method used is a combination of literature review and interviews/meetings with project managers of different companies working on large-scale applications. The main focus of my studies involves analysis and comparison of the challenges faced by the managers and the problems identified in the literature. The highlights of solutions suggested by me in this thesis are; to do frequent meetings, always recap meetings, use of consistent communication channels, Monitor performance, give recognitions, make positivity a core value, provide trust and respect to team members, protect interests of employees, act with integrity and keep commitments, be honest and supportive to your team members, set clear goals, frequent feedbacks, open growth and learning opportunities for employees. These suggested solutions will enable managers to manage project easily and effectively. The result comprises on the analysis of data collected through interviews and literature and by applying personal, professional development and managerial experience.

Keywords: Project Management, Large Scale Agile, Communication, Trust, Knowledge Sharing, Teamwork

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1. Introduction

This chapter will enunciate the motivation, Problem Statement, Challenges and introduction of project management with communication and trust issue for managers. It will also include models in project management, tools, techniques etc. furthermore we will discuss scope of project management, motivation and our research question in this chapter.

1.1 Aim and Scope

This research aims to identify and structure the core challenges faced by project managers and organizational leaders in managing large scaled software development projects. The research work is done within the scope of the software development industry, that provides software development services through consultancy, in-house development, resource outsourcing or product-based software development solutions. The products and services offered by the organizations include Enterprise based Financial, Automation, Engineering, Management Applications on Web, Windows, and Mobile, Services based platforms etc. Using cutting edge technologies and competent resources. As the study is for managing the large-scaled agile project so it will probably involve all types of development irrespective to the technology, platform, competence etc. Our primary focus will be on the management practices related to communication and trust. The researched results will base on data collected on the collective experience or the informants and the literature review.

1.2 Motivation

The popularity of agile methodologies has been increasing day by day. Involving direct communication with customers, managers and stakeholders. It provides the flexibility to handle change request during the development stage as both technology and the business requirements keep changing with time [4].

Agile project management is not limited to the functioning of project management instead it encompasses all aspects of development that includes business requirement analysis, planning, development, quality assurance, testing, change management and delivery [7].

During the practical course of software development experience and team management, I got the opportunity to be a part of small and large-scale agile software development projects, Involving communication with teams, clients, managers and stakeholders throughout the software

development lifecycle. I am responsible not only for the software development but to manage, extend and organize teams globally, to backup business demands with the rapid and extensive software development needs, on critical solutions.

The studies in the course "INF 5181 - Process improvement and agile methods in software development" arouses my interest and provided me good grounds for the research in that field, particularly on the issue of challenges faced by the managers in executing a large-scale project using agile methodologies. With the help of research analysis on literature and interviews with leaders, I feel confident enough to carry out the research and come up with the solutions for the challenges faced in development. I also believe that the results will help managers and leaders to pave new paths in the field of adopting agile methodologies for large scaled software development with good communication and trust-building methodologies.

In this thesis, I have used some ideas and theories from the master thesis of Amanpreet [41], The discussion in her master thesis is relevant to the communication and trust on global level and is mostly based on literature reviews and semi structured interview. So, I have decided to use more practical approach in identifying issues and challenges by interviewing experienced professionals and the literature review.

1.3 Problem description and Research questions

Agile project management is a broader term, and it involves several exciting areas for research, but I found communication and trust to be the most engaging part of the research. My research on agile project management will try to contribute to increasing the insights of large-scale software development and its management. Thereby, my master thesis has the following overall research question.

How can communication and trust be managed in large scale software development?

The main question helps to further look into the topic of project management and its practical implications. To better understand the practical approaches and its adoption, this research work is carried out with multiple Companies, having CMMI (Capability Maturity Model Integration) level-5 and also ISO following ISO standards. The companies are working with large scale software development projects, using agile-based development methodologies.

The research question is divided further into sub-questions to clear the vision of aspects that interfere with management by looking at hindrances.

Sub Question 1: What are the barriers or challenges in communication and trust in large scale software development?

Sub Question 2: What are the impacts of lack of communication and trust?

Sub Question 2: What are the possible solutions to overcome these challenges?

By conducting the research with the outlined goal and substantive sub-goals in mind. It will be possible to identify the challenges faced by the managers, how they are managing communication, trust in a practical working environment, and how they conquer these challenges.

1.4 Challenges

Large scale project management also have bigger problems and challenges like complex issues, discussions, risk involved etc. The bigger the domain the more complex it will be, and more complexity will lead to higher risk levels. In large scaled solutions the resources from multiple groups, and stakeholders from various disciplines are involved. All stakeholders have different competence levels, knowledge and views. Such large project needs high degree of transparency to check and control problems, this requires identification of problems and their possibilities at the initial level to reduce risk. Report generation also gets tougher because of excessive business requirements. To keep transparency and everyone on a same page of communication plays a key role. [10] Communication is a key element to create sense of ownership among all stakeholders and team members. To enable effective communication online tools are used to keep everyone posted with the current situation and avoid communication gap. The documentation is maintained and regular meetings are arranged in order to keep everything in balance. To do this, it is necessary to do regular meeting to engage everyone, we must have to create peaceful environment that all must show respect to others opinions, this will help in reducing conflicts.

Projects having complex domain or working at critical projects need expert's engagement from day 1. In small scale projects project manager can be expert too, but in large scale projects project managers cannot be acting project manager and expert at same time, we need full time experts

dedicated to our project as we mention above that proactive approach is very important in order to avoid problems. For this we can hire agile coaches, agile project managers, business analyst, solution architect, devOps agile coaches etc. [10]

There have not been done extensive empirical research regarding large-scale software development so one of the main challenges we will be not to repeat what others already have found in their literature reviews, but we'll try and contribute with some new insight. As the main focus of this search is from a project manager view there might be some limitations for the research being done, as large-scale agile project management is quite a new field of study. As there are time constraints on this project this can also be seen as a challenge as we will have to read many articles within a short time frame and base the result on what we find within the time. We have chosen some few articles to work closer with, and with better time, there would be likely to maybe found even more articles and analyzed them closer.

1.5 Method

The research in this thesis is based on in depth analysis of interviews taken from the practically experienced professionals that are leading teams in different companies and the literature review. The selection of companies for interview, criteria for article selection and the rationale for chosen approach is explained in details in chapter 3.

1.6 Contribution

The thesis work will be useful for managers/leaders of different organizations of all sizes, who are interested in understanding the organizational or team level challenges faced by managers globally? The strategies presented in this thesis will not only help leaders in dealing with the challenges but will also be helpful to students and researchers, who want to board on the journey of exploring more challenges and solutions in large scale software development.

1.7 Thesis Structure

Our first chapter is introduction to project management, motivation, our problem statement and challenges faced at large scale project management.

In our second chapter I will tell about the background of software project management, its methods, tools and techniques. We will also discuss work done in literature about project management, in large scale software industry and the skills observed in literature to build relationship in software project management.

In third chapter I will discuss in detail about all the work done, in the field of software project management in small companies as well as in large companies, their problems, solutions and challenges that are discussed in literature and I will also discuss about data collection methods and the interviews. The structure of this chapter is also similar with the structure used by my senior in her thesis, I have adopted the same technique as her to spend more time on the practical issues and their solutions [**Error! Reference source not found.**]

In chapter 4 we will share our findings, interviews performed during this thesis, comparison of results.

In chapter 5 we will conclude our thesis, and in our last chapter, I will discuss its limitations and future work.

2 Background

This chapter describes about the most commonly used traditional and agile software development methods before going further in details of agile project management. Afterwards, we will discuss the issues and benefits in adopting agile project management for large scale software development, and the challenges faced by the managers.

Traditional agile software development uses different types of software development life cycle models, i.e. Waterfall model, spiral model etc. Agile method is an iterative method and team-based approach, the main difference between agile methodology and traditional methodology is the sequence of steps performed during software development, like traditional method uses linear approach in which activities are performed in sequential order. While agile methodology is an iterative methodology and its main goal is to quickly deliver product with complete functionality, they are completed in sprints and every sprint consist of 1 to 4 weeks and list of deliverables are mentioned for each sprint. Typical agile approach consists of three stages that we conclude by doing literature review [5].

| Project initiation | → | Sprint Planning | → | Demos |

Figure 1 – Stages of Agile [5]

Communication in agile does not happens by chance it focuses on interactions and verbal communication rather than documentation. That's why it is necessary for everyone in team to understand communication protocol and objectives. It must be clear regarding how each function and individual is expected to interact, deliver and communicate outputs to team. Agile has no

specific approach when someone need to say anything, say it. Rather than ignoring the issue thinking it will go away, the more early an issue is dealt, better are the chances of recovering from loss with minor impact. [19]

Scrum is an iterative and incremental software development process that is designed to respond changes quickly. This methodology is suited for small self-organizing teams of not more than 10 members, to enable close collaboration, teamwork, effective communication and fast feedback. Every team member has a clear role to work on and collectively whole team is focused on a single goal to achieve [7].

2.1 Traditional software development

Below are some of the traditional software development models that are in use, I will discuss two of them and then will proceed with the agile development methods as discussed in literature.

2.1.1 Water Fall Model

The waterfall model was first developed in the 1950s [51]. It is a traditional software development approach which has been used for many years for the development of software [52]. The waterfall model approach for software development is also called (by many people) as linear sequential life cycle model, In waterfall model the project work is divided into different phases and these phases are completed sequentially [53]. The picture given below helps in understanding the flow in waterfall model [53].
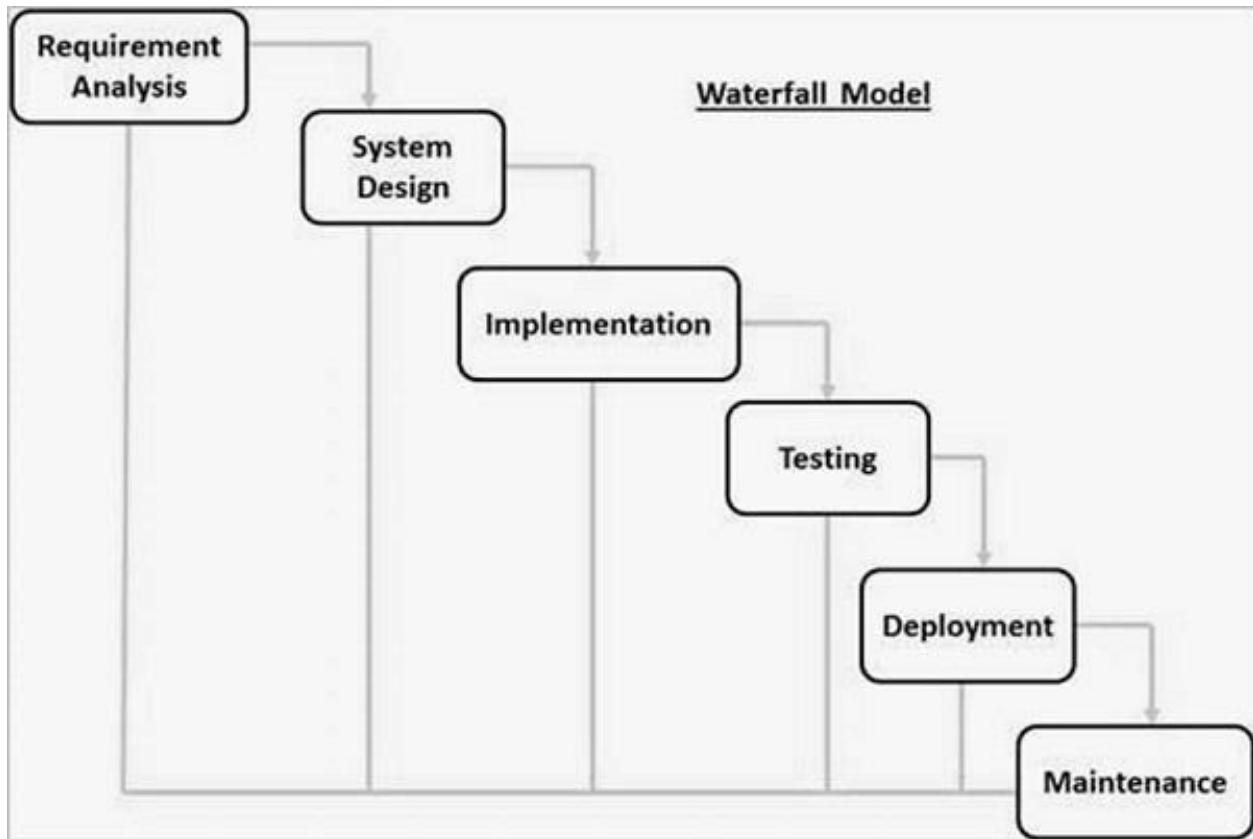
Figure 2 – Phases of waterfall model [53]

Waterfall model follows through the following phases [54]

System Requirements: in this phase the basic building blocks are established.

Software requirements: In this phase the software requirements are gathered.

Architectural design: In this phase the specific requirements are defined

Detailed design: In this phase the software part is defined.

Coding: Coding Implementation is done in this phase.

Maintenance: Issues after the post release are done in this phase.

Every approach has its advantages and disadvantages, many people argue that the waterfall model approach has some issues, one of the most notable issue is that changes into the software development are not possible [53]. Following table describes the attempts for strengths and weaknesses of the waterfall model [54].

Strength	Weakness
• Minimizes planning overhead since it can be done upfront • Structure minimizes wasted effort, so it works well for technically weak or experiences staff	• Inflexible • Only the final phase produces a non-documentation deliverable • Backing up to address mistakes is difficult

Table 1 – Strength and weaknesses of waterfall model

The waterfall model is ideal for usage for projects which have clear goals and detailed requirements but for projects which are complex it is not ideal [54].

2.1.2 Spiral Model

The spiral model combines the iterative development process model and the waterfall model approach [55]. A spiral model consists of four stages Planning, Risk Analysis, Engineering and Evaluation [54]. The spiral model provides advantages as it has the capacity to add new feature to the software while it is still being developed another aspect which makes it a better approach is that the user input in the whole process begins at a very early stage [55]. The following picture shows a spiral model [55].
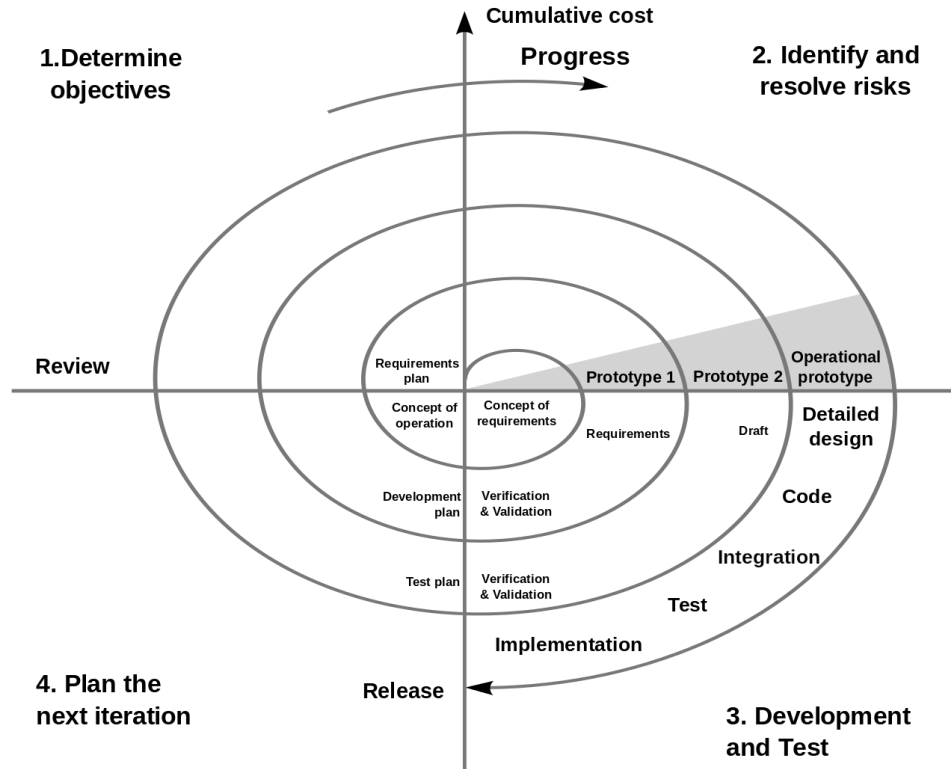
Figure 3 – Scrum Model [54]

In the spiral model in every cycle a prototype is developed having the user requirements, this helps keep the progress in track [51]. The four steps in the spiral model are defined below.

Objective setting: Aims for this phase are defined.

Risk assessment and reduction: Potential risks in the project are identified and actions are taken to reduce them.

Development and validation: Development for the model is identified and implemented.

Planning: The project is assessed and the planning for the next phase is done.

2.2 Agile Software Development

The software development processes today are affected by change, and project requirements are often unclear, and even unknown, which urge the need of more agile strategies to be developed [7]. In late 1990's, several methodologies came along with the different combination of old and

new ideas. These new methodologies had several methods in common, they all emphasized on close collaboration between the development team and business stakeholders.

The agile manifesto was formulated in 2001, Which states the following principles for new ways to uncover valuable strategies for software development [6].

Individuals and interactions over process and tools
working software over comprehensive documentation
Customer collaboration over contract negotiation
responding to change over following the plan

Some of the characteristics of agile methods is the value of competent people within the team who has knowledge and relations that proves to be a valuable contribution in software development. Also, evolutionary delivery through short iterative cycles - of planning, action, reflection - intense collaboration, self-organizing teams, and a high degree of developer discretion are all aspects of agile practices [8]. Agile methods focus on actively involving customer from the beginning of process, facilitate feedback and reflection. With the help of this development process becomes smoother and is more likely to end up with satisfying outcome [10].

As compared to traditional development methodologies, agile development has a different way of thinking, working and collaboration. "*Most organizations cannot ignore the agile wave, but for those steeped in traditional systems development, adoption of agile methodologies will likely pose several challenges.*" Which means it will have a high impact on organizational structure, culture, and management practices. In order to adapt agile methodologies successfully, the organization must rethink of their goals and reconfigure human, managerial, and technology components [11]. While traditional methods focus on stricter management and rely on up-front planning, agile methods aim at accepting and efficiently managing change [12].

Highsmith summarizes agile practices to encourage change request and questioning assumptions. He states the importance of flexible planning, extensive collaboration, and learning to be able to achieve agility in a project [13]. Since agile approach emphasizes less documentation, it gives the flexibility to respond and cater the changing requirements [14]. Lee & Xia (2010) defines the team ability to respond to changing requirements efficiently and effectively, as software development

agility [15]. This agility is possible by having short, incremental, iterative development cycles, self-organizing teams, active involvement of stakeholders, and continuous delivery.

Agile software development has a different approach to planning, control and coordination, and especially the inter-team coordination. By enhancing thorough collaboration and communication between team members, it provides the basis for collective action. This also empowers the team members with the ability to contribute in decision making process and not to be restrained to a certain specialized role. This increases the diversity/variety of the teams and enables them to self-organize and respond with alacrity to emergent situations [11]. One of the characteristics of agile teams, which Dybå et al. refer to, is that "*they have faith in their abilities, show respect and responsibility, establish trust, and preserves the quality of working life*" [16]. This describes the foundation for good agile practices, where the team members are motivated, self-organized and empowered.

Agile development is fundamentally people-centric and recognizes the value of team members' competence, whereas, empowering right people with appropriate skill set for decision making is also critical. Diverse skills and perspectives trigger learning and innovation, which can lead to efficient solutions, to conquer complex challenges and problems [15]. However, this relies on team member's communication and collaboration skills. As diverse teams will have different opinions and solutions that may cause conflicts. This will be elaborated further in section below. [22]

Unlike the traditional methodologies, agile methodologies deal with unpredictability by relying on people and their creativity rather than on processes [11]. the recurrent and fast communication in agile software development results in excellent performance of teams and this results in excellent product [32].

2.3 Scrum

Scrum is an iterative and incremental software development process that is designed to respond changes quickly. This methodology is suited for small self-organizing teams of not more than 10 members, to enable close collaboration, teamwork, effective communication and fast feedback. Every team member has a clear role to work on and collectively whole team is focused on a single goal to achieve [7].

Scrum represents a lightweight process framework used to manage and orchestrate software development [17]. In scrum people can address complex adaptive problems, productively and create deliverable product of the highest possible value [18]. The model of how scrum process is practiced is presented in Figure 2.2. Further it will be described as.

In Scrum teams are self-organizing and cross-functional and the team model is designed to optimize flexibility, creativity and productivity. The scrum team consists of Product owner, Development team and a Scrum Master [18]. The development team designs the architecture of the project and identifies the chief architect in the first phase of Initial Planning. At this stage all the scope/goal and vision of the project is defined and the chief architect has to ensure the consistency of vision throughout the development process [7].

After the initial planning, the project is divided into small workable increments called sprints where the goal of the project is to deliver the working product incrementally. Each sprint usually lasts from one to four weeks, and the key idea behind each sprint is to deliver valuable, qualitative functionality at the end of a sprint, and each of these product increment will be developed on previous increments [7]. During a sprint it is usual to have a daily standup meeting, to get the status of what has been done and what the plan for today is. This meeting build coherence and works as a team-building purpose as it makes your work visible to others as well as feeling part of a group. It also serves as keeping everyone informed of team progress and obstacles, and give the opportunity to solve obstacles as quickly as possible.

The team also have to decide on a Scrum master. A scrum master should work as a motivator and coordinator for the rest of the group by ensuring that everyone makes progress, record the decisions made and tracks action items, and keeps the scrum meetings short and focused. The below picture that we studied in literature is describing about clear overview of scrum [7].
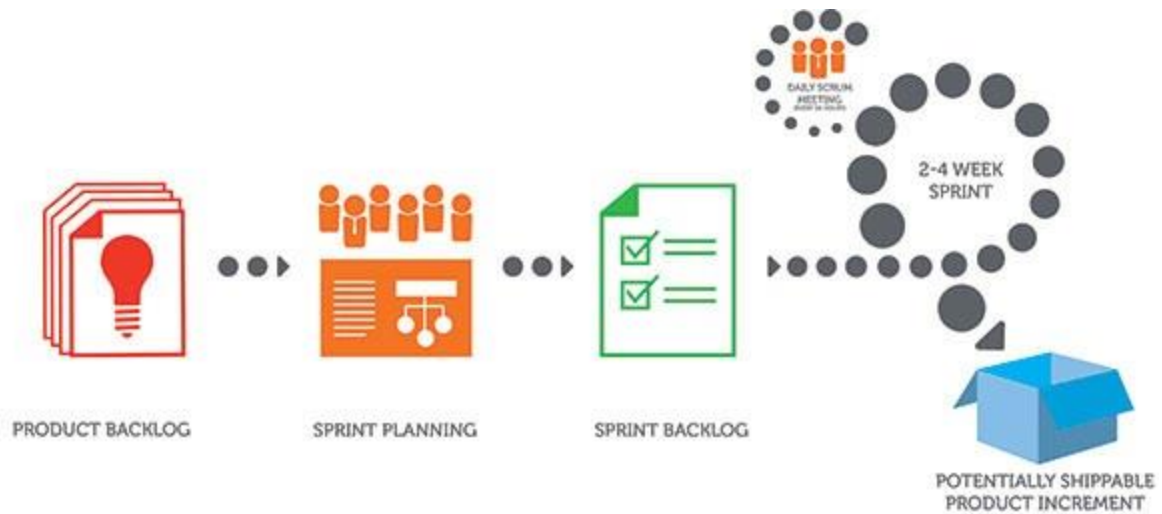
Figure 4 – Overview of scrum [7]

The scrum model works on the following three artifacts Product Backlog, Sprint Backlog and Increment [18]. The team then have to define and organize all the tasks/features and create product backlog. Here, the high-level description of all the required features of the project is defined. While starting a new feature or task from product backlog a sprint planning was done and a sprint backlog is created, that contains all the information to how to carry out and what to achieve in the sprint.

At the end of a sprint the team shall have produced a valuable increment which builds on previous increments. There is common to have a sprint retrospective at the end of a sprint where all the stakeholders also should be in evolved where work can be added, eliminated or reprioritized.

2.4 Agile versus Traditional Methodologies

Agile methodologies differ in many ways from the traditional development methodologies. The following Table 2.1 that we pick from literature has illustrated the most important differences between traditional and agile methodologies which one should notice [41]

	Traditional	Agile

Fundamental Assumptions	Systems are fully specifiable, predictable, and can be built through meticulous and extensive planning	High-quality, adaptive software can be developed by small teams using the principles of continuous design improvements and testing based on rapid feedback and change
Control	Process centric	People Centric
Management Style	Command-and-control	Leadership-and-collaboration
Knowledge Management	Explicit	Tacit
Role Assignment	Individuals favors specialization	Self-organizing teams encourages role interchangeability
Communication	Formal	Informal
Customer's Role	Important	Critical
Project Cycle	Guided by tasks or activities	Guided by product feature
Development Model	Life cycle model (Waterfall, Spiral etc.)	The evolutionary-delivery model
Desired Organizational Structure	Mechanistic (bureaucratic with high formalization)	Organic (flexible and participative encouraging cooperative social action)
Technology	No restriction	Favors object-oriented technology

Table 2 – Traditional vs agile software development [11] [41]

Several agile development methodologies have been developed since the introduction of the agile manifesto - like Scrum, XP, Crystal methodologies, Feature-Driven Development (FDD), etc. They all share a more collaborative development, "lean" mentality[1], Close collaboration with customer, and an acceptance that uncertainty is a part of software development. Each method has its strengths and weaknesses and is thereby suitable for different kinds of projects [11]. In next section the most commonly used agile methodology "Scrum" will be discussed.

2.5 Communication and Trust in Project Management

When teams working on same project work together effectively and efficiently then all stakeholders and team members need trust among them, because each member have different interests and roles. Like a product owner has responsibility of defining and refining product backlog, then we have multiple issues like meeting deadlines, choosing the most valuable work. Bug fixing, managing time, cost etc. if trust between team's breakdown it effects our products and process too, the consequences may be rumors, gossips whining, hidden agendas and sometimes destabilizing behavior by team members such as delaying of information, providing misleading answers, giving random and unrealistic ideas or lying. In short, projects suffer a lot if there are trust issues in process [22]. Agile methodology talks in favor of environment in which we have collaborative environment and effective communication, while effective communication is very difficult in distributed environment in which there are dispersed teams [26] Authors[27] compared two distributed agile development case studies, and conclude that bad communication in organizations can result in severe problems even project failures, there must be solid requirements and sufficient communication for successful completion of project. The best way to look are cooperate communication is to understand how functions are developed in organization. In old times a term used communication was "public relations" and it was very strategic at that time. With time other communication techniques and tools evolved like media relations, digital communication was introduced for communicating with stake holders [29] [30].

---

[1] Lean mentality means in this context: minimizing unnecessary work

Low level of trust may result in project blend, low morale in team, and unsatisfied customers. As product owner we have many responsibilities to maintain a healthy product development community. We understand from literature that there are three type of trust that effect the trust of organization. [23]. In literature [24] authors discussed that, how self-managing teams are involved in agile technique, teams are authorized and accountable for meeting projects objectives. Project managers have a more sense of trust in agile software development rather than traditional methods. Trust is developed by positive attitude, behavior good perceptions, building trust in organization helps to create a better environment [27]

2.5.1 Types of Trust
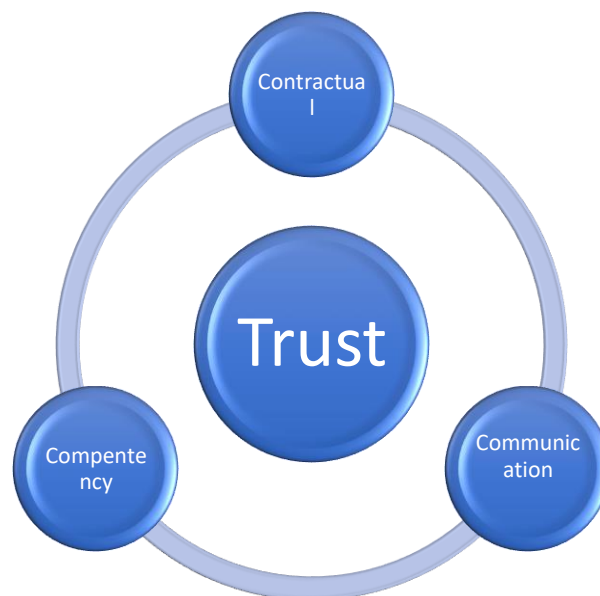
Type of trust required in organization [23]

Contractual trust: this kind of trust is based on unstated contract

Communication trust: It states that there must be honest and frequent communication between team members, team member must have courage to tell truth, admit their mistakes and there must be level of confidentially between team members

Competence trust: it states that there must be respect and appreciation for team members getting their job done on time, and organization must promote mutual learning and developing skills for everyone.

The best time for trust building is at the start of project when we decide what to develop, but trust building is most difficult task, especially the major stage of project is when team launches and define scope of project, and refine its backlog. In order to maintain all above-mentioned level of trusts product owner has to do work consistently from liftoff and throughout the product life cycle.

Nils Brede described that how globally distributed software development became problematic, and difficult to manage. They also discussed about the main factors that causes mistrust some of them are poor socialization, increased monitoring on resources, lack of direct meetings and how these factors decrease moral of teams [25]

As mentioned in Literature [40] trust can be build using the Competence, connection, communication and honesty.

Competence: be capable

Connection: be empathetic

Communication: be clear

Honesty: be reliable

As stated in diagram [40] below
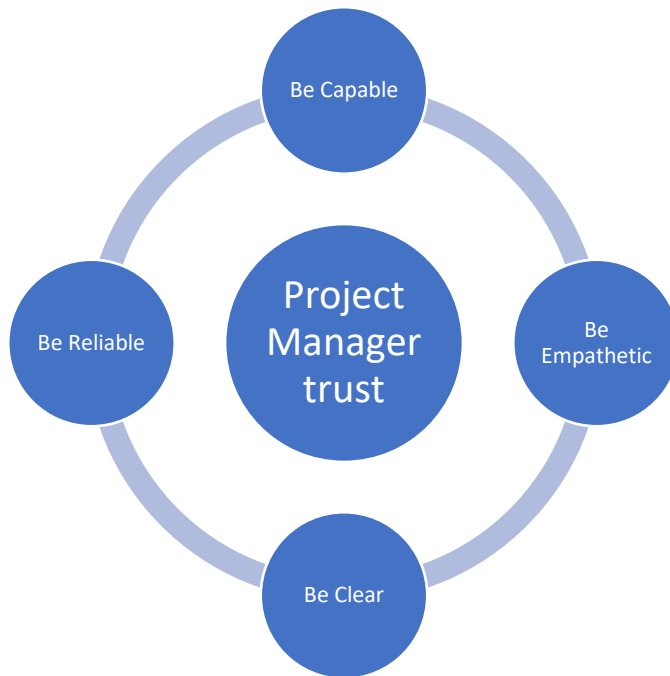
2.6 Project Management and its role

Project management is the practice of originating, preparation, achieving, managing, and closing the work of a team to accomplish exact goals and meet precise success criteria at the specified time. The major challenge of project management is to achieve all of the project goals within the given constraints. We have studied in literature below mentioned challenges for project managers. [34]

1. Poorly defined Goals
2. Unrealistic deadlines
3. Scope creep
4. Insufficient team skills
5. Improper communication
6. Geographically dispersed teams
7. Risk Management
8. Not taking benefits from project management tools
9. Issues within Teams

3 Method

Data gathered in this thesis is mostly from understanding and reading of literature related to project management, project management tool, issues and challenges. Reading research papers and literature related to project management and its issues helped me a lot to understand the basic theory and problems. Apart from this literature review, Interview process helped me a lot, I have learnt a lot of ideas concepts after meeting with project managers of companies and conducting their interview. In this chapter I will discuss about my understanding of literature and other data collection techniques that I used in this thesis. I will also discuss about the choices I made in literature review and which methods and tools I used.

3.1 Data Collection

I read multiple things I found on the internet/ library that is related to project management, agile, communication and trust in software project management. Following mentioned websites were of my main interest during literature review and understanding of this thesis

Google Scholar	https://scholar.google.com.pk/
ACM	https://www.acm.org/
IEEE	https://www.ieee.org/
Research gate	http://researchgate.net
Science Direct	https://www.sciencedirect.com/

Table 3 – Data collection websites

The Main keywords of my research are:

 Project Management, Large Scale Agile, Trust, Global software development, dispersed Teamwork, success criteria, challenges, distributed teams, agile projects, and qualitative study.

3.2 Literature Review

Before starting the journey of this thesis, I have gone through a lot of research articles, books, case studies related to my field. It helped me to understand the overview of available theory related to communication and trust issues in project management. For evaluation of relevant research papers, I made a search measure, the measures used for selection process is stated below

Distributed Study	It says that research article must contain issues related to communication and trust issues in project management
Data collection Method	This method says that an appropriate data collection methods must be used and explained multiple methods of data collection
An empirical study	Empirical study says that we must include research from industry

After downloading research articles from websites mentioned above, I make a repository in my computer the structure of repository is given below. All the research articles were saved with their relaxant's tags, it made my research easy, that when I need to consult some paper it was easy for to approach it.
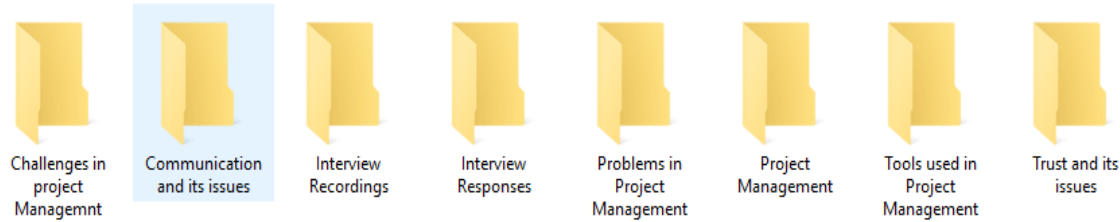
Figure 5 – Research / Literature Repository Structure

3.2.3 Snowball sampling

I have found this technique the most relevant one that helped me in finding out the most relevant articles. It is defined as a method of selecting new studies from already selected studies, in other words this method is based on the similarities between old and new studies [42] in my thesis I have used this method as articles were selected from reference list of selected articles. Amanpreet has also used the same technique in her thesis and that gives me confidence in identifying this technique to be most relevant for my thesis [41]. It helped is in finding most relevant articles below is list of few research papers with some summary of them that are studied during literature review of this thesis.

Year	Title	Summary
2016	A qualitative study of success criteria in Norwegian agile software projects from suppliers' perspective	Paper described the success criteria of software industries who are using agile methods. Success criteria of project management is delivering product on time, and client satisfaction. they highlighted the difference of projects who are using agile and those who are using water fall model.

2003	Agile Software Development: It's about Feedback and Change. *Computer*	This paper discussed how agile software development bring a sensation of firmness in software development industry some school of thoughts argue enthusiastically about agile and others are equally against it, while some school of thoughts consider a mix of agile and plan driven methods a good approach.
2012	Agile Practices: The Impact on Trust in Software Project Teams	This study describes how self-managing teams are involved in agile technique, teams are authorized and accountable for meeting projects objectives. Project managers have a more sense of trust in agile software development rather than traditional methods.
2008	Understanding a lack of trust in Global Software Teams: a multiple-case study	This study described that how globally distributed software development became problematic, and difficult to manage. They also discussed about the main factors that causes mistrust some of them are poor socialization, increased monitoring on resources, lack of direct meetings and how these factors decrease moral of teams.
2011	Effective Communication in Distributed Agile Software Development Teams	Agile methodology talks in favor of environment in which we have

		collaborative environment and effective communication, while effective communication is very difficult in distributed environment in which there are dispersed teams
2001	The Role of Trust in Organizational Settings	Trust is developed by positive attitude, behavior good perceptions, building trust in organization helps to create a better environment
2007	Communication in Distributed Agile Development: A Case Study	this study compared two distributed agile development case studies, and conclude that bad communication in organizations can result in severe problems even project failures, there must be solid requirements and sufficient communication for successful completion of project.
2013	Corporate Communication	The best way to look are cooperate communication is to understand how functions are developed in organization. In old times a term used communication was "public relations" and it was very strategic at that time. With time other communication techniques and tools evolved like media relations, digital communication was introduced for communicating with stake holders,

2003	New directions on agile methods: a comparative analysis	agile software development is characterized by four attributes i.e. it is incremental, cooperative, straightforward, and adaptive. Overall the methodology refers to software release with rapid developments, more collaboration and communication with customers, and changing requirements throughout the development cycle
2010	A teamwork model for understanding an agile team: A case study of a Scrum project	This study did research in software company that introduced scrum, they focused on human sense making, that how mechanism of teamwork is understood by people. They explained their project by Dickinson teamwork model, their main focus is on leadership, coordination, strong communication.
	Communication in Distributed Agile Development: A Case Study	Multiple case studies investigating communication in distributed projects, Data collection: Onsite observations and interviews
2007	The qualitative interview in IS research: Examining the craft	Interview are the main tool to guess what is in mind of other people, other people opinions, thoughts, feeling and experience about some certain process, event, product or service. Interviews in further divided into three main categories; structured interview, unstructured interview and semi

		structured interview. Interview can be qualitative or quantitative but the qualitative approach of interview the most commonly used approach in research
2011	Barriers in the selection of offshore software development outsourcing vendors: An exploratory study using a systematic literature review	The main elements involved in software process improvements are processes definition, appraisal, and process deployment. And organization politics is one of the main barriers in software process improvement. Because SPI is the main change in organization and people oppose changes, in results they create political environment. Different resources in employees in organization have different interest, goals and skills, so these things sometimes create political environment in organization that everyone is concerned about their own goals and interests. If project manager aligns organization goals with employee goals then this political environment can be reduced.
2008	Understanding a lack of trust in Global Software Teams: a multiplex-case study	Projects in which large development is involved are not very much time bound, so more the development the more communication is involved and sometime there might be miss communication that leads to lack of trust among resources. The Key factor that we have studied from literatures are Poor

32

		socialization, socio culture fit, bad work practices, Increased monitoring on employees, Reduction of unpredictability in communication, Conflict handling and Cognitive based trust so the solution of these is to avoid these mentioned problems in order to create sense of trust in company
2016	Ethical Leadership Behavior and Employee Justice Perceptions: The Mediating Role of Trust in Organization	This study discusses using the data gathered at two phases, and discusses how ethical leadership behavior impacts employees' evaluations of organization focused justice, for example procedural justice and distributive justice. This justice is the key to establish trust in organization.
2019	Trust in Virtual Teams: A Multidisciplinary Review and Integration	The organizations have increasingly turned to the use of virtual team to handle the nature of work, also technology is helping a lot to establish trust within organizations. This study review 124 theoretical articles related to multidisciplinary literature on trust in virtual teams
2017	The Power of Positive Leadership: How and why Positive Leaders Transform Teams and Organizations and Change the World	This Books discusses multiple concerns related to establishing positivity within organization, how to remove negativity and how they are affecting our culture.
2018	Small Group and team communication	This book addresses the concerns of groups on organization, their interactions, roles, norms diversity in

		people. It also discusses in details about verbal and nonverbal communication, decision making and problem solving, conflicts and creativity in organizations
2015	What drives knowledge sharing in software development teams: A literature review and classification framework	This study provides a detailed literature view on knowledge sharing drivers in software teams and establish classification framework using an organizational change perspective.

Table 4 – List of research papers

3.3 Other sources of Data Collection

In addition to above mentioned research papers, following video courses helped me to understand the literatures and basic concepts about my thesis.

Source	Name
edX	Agile Project Management by University of Maryland
Coursera	Agile Development Certification by University of Virginia
Udemy	Agile Development Certification by Agile Certification Training Courses Online
Coursera	Software Processes and Agile Practices
Pluralsight	Agile Learning Path

Table 5 – Data collection sources

3.3.1 Agile Project Management in Business/IT Industry

It is important to note that agile project management encompasses all aspects of project delivery and not just the sole function of project management practices. It is inclusive of all business analysis, systems analysis and development, as well as all levels of quality assurance and testing The principles of the Agile Manifesto are as follows: We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value: Individuals and interactions over processes and tools working software over comprehensive documentation Customer collaboration over contract negotiation responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more. ("Agile Manifesto," 2001) Agile methodologies are not a single methodology; it is a group of software development methods based on iterative and incremental development approaches. In addition, agile methodology focuses on customer satisfaction and bug free products. According to Abrahamsson, P. et al. (2002), agile software development is characterized by four attributes i.e. it is incremental, cooperative, straightforward, and adaptive. Overall the methodology refers to software release with rapid developments, more collaboration and communication with customers, and changing requirements throughout the development cycle. It is more adaptive with the ability to react to the most recent changes. Agile methodology practices are friendlier towards the shifting priorities that are a fact of life in today's fast paced, competitive organizations and because of this, stakeholders are more satisfied with this process (Cohn, 2009). Agile methodology has resulted in faster growth and development in the software industry 9 as well as improving the communication and collaboration both inside the agile team and with the customers. Extreme Programming (XP) and Scrum are the two dominant methods used in agile methodology. XP concentrates more on the development rather than managerial aspects of software projects, while Scrum method includes both Scrum management and Scrum development process.

3.3.2 Modes of Better Communication

We have concluded from above research that below mentioned are some of the modes for better communication.

Face to face conversarion

Email conversarion

White Board conversation

Documentation Option

Video Conferencing

Online chat/Telephonic conversation

3.4 Information Gathering (Data Collection)

Some of the information gathering techniques are given below, we gather information using case studies, interviews and observations.

Case Studies

Checklists

Interviews

Observations

Surverys and Questionnaire

3.4 Interviews

For Research purpose and data collection I scheduled my discussion session with project managers of companies, I sent them my interview questionnaire few days before going to their office so that they are prepared for every answer. I when reached for my session and before starting session I asked for their permission of recoding interview and they all are open to it. I recorded all sessions and write after session I transcribed all the recordings in my laptop. For recordings I used my mobile recorder and for transcription I used Microsoft word. After transcription I managed all the questions and their answers properly.   In next chapter I have shared my all research sessions, my finding of research and discussion on this research.

Interview are the main tool to guess what is in mind of other people, other people opinions, thoughts, feeling and experience about some certain process, event, product or service. Interviews in further divided into three main categories; structured interview, unstructured interview and semi structured interview. Interview can be qualitative or quantitative but the qualitative approach of interview the most commonly used approach in research. [35][36][37]

Structures Interview: Structured interviews are highly planned pre-determined and has regularized in terms of sequence. Proper guideline available in this interview. The main goal of this interview is that same questions are presented by interviewee. [35][36][37]

Unstructured interview: in literatures this term in interchangeably used with informal discussion, detailed interview and non-standard interviews. In this interview questions and answers are not categorized and predetermined. As it has pre-determined questions it doesn't means that questions can be non-directive and random, it cannot be started without complete preparation and information. Researcher must have idea about the purpose of interview. There are many challenges of this interview, researcher must know about the field and he/she must develop trust and good rapport to get access to interviewees, because session time of unstructured interview is more as compared to semi structured and structured interview [35][39]

Semi structured interview: in semi structured complete script of interview is available beforehand. But it still needs some inventiveness during the interview means interviewer has some room to change or improvise questions at run time based on the answers of interviewees.

I have used semi structured approach in my interview, but I do not want to restrict responded in some boundary or restricted answers. I want responded to discuss about the ideas and past experiences about the communication and trust in project management. I wrote all questions beforehand because I do not have previous experience of conducting interviews that written questionnaire helped me and gave me confidence during the interview process.

3.4.1 Informant Selection

The main task for me was to find the right people for interview. I struggled a lot to get a case study or to get respondents who willingly wanted to participate in the interviews. As the topic of my thesis is related to communication and trust issues in agile project management was the major task was to find respondents who have experience with agile project management.

Below is the introduction of interviewers that were part of my research,

Respondent 1: He is CEO at company managing 5 departments, with average 5-6 members in one team following Hierarchal organizational structure. Before starting the interview he stated some basic knowledge and work flow about his company he said I usually help my teams, by providing them the tools they need, by talking with them about how we treat your colleagues and employees, it comes to ethics and morals how we handle employees, I personally don't try to give instructions but tries to give advice. For me if I am giving instructions, I can do it by myself.

Respondent 2: He is CTO at a company managing 3 main teams and each team has average size of 7 people following flat organizational structure. He further added before starting interview that he helps his team members by keeping they upgraded new IT things that are of their interest as well as interesting for the business. By arming them up with the latest tools and technologies and by keeping my self -available when they need me at all times.

Respondent 3: He is CTO and Co-founder at a company managing 4 teams with 3-5 members in each team, following Hierarchal organizational structure. He said that Being business owner I consider them as an asset and treat them like team members but keeping balance is a key thing for example when it is about to take decisions then as an employee. He further added before starting interview that he helps his team mates by listening their problems and coming up with the solution to make them enjoy the work they do. By providing tools needed for their job to work efficiently

and by talking with them how to communicate with other colleagues and customers to keep the working environment good. Preferably advices over instructions.

3.4.2 Interview Questionnaire

Opening I started the interview by giving my introduction and gave the short introduction of my thesis and before going further all the interviewees have also introduced themselves.

Starting Questions: As I have written all questions before hand, I also had some idea about the company form their social profiles and website. As I wrote all questions beforehand because I do not have previous experience of conducting interviews that that written questionnaire helped me and gave me confidence during the interview process.

Key Questions: My key question was related to communication and trust issues, challenges in project management.

General Questions

1. What is your communication style with employees?
2. How will you ensure that there are no communication gaps between you and the team you are managing?
3. How will you ensure that your team is comfortable talking to you about any toxic problems they're facing?
4. How do you team up resources and manage sense of trust among them?

Closing Questions: My closing questions was asking them about the suggestions and new Ideas and I also discuss is there are any gap in my questions. Few closing questions are mentioned below.

1. What other challenges are you facing regarding communication and trust issues among teams? And how are you overcoming these challenges?
2. In case of any confusion after this interview, can I contact you for more questions?

3.4.3 Interview Process

I conducted all the interviews live, I approached them over emails and by using some friend's contacts to agree them for interview. Before going to conduct interview, I contacted all the relevant person on skype and gave my confirmation and also asked about their availability for interview.

3.4.4 Transcribing interviews

I have recorded all interview with the permission of interviewers and also note some relevant details on notebook. When I reach home after conducting interview I listen to all interviews and transcribe them into a word file. I did this process for all three interviews conducted.

3.4.5 Interview Analysis

As I had done transcription of interview the next big challenges was for me to perform my analysis. As discussed by Maxwell [43] that performing analysis on data is a cyclic process not linear process. As mentioned in diagram below.
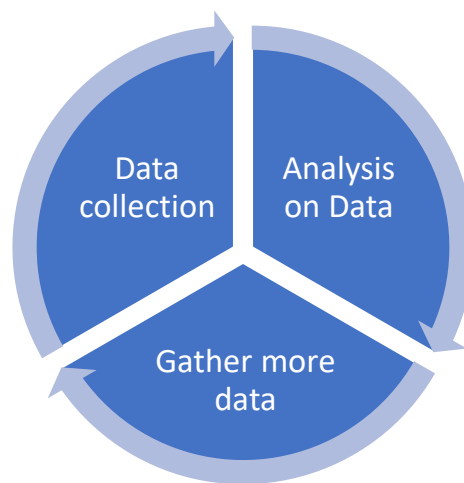
4 Findings and Discussion

In This chapter, I will share my findings about the interview conducted during my research, and I will also discuss about the challenges in my research and what challenges software industry is facing related to communication and trust issues in project management.

4.1 Communication challenges in Project Management

The main findings were the following

- Lack of trust among resources
- Lack of appreciation for hard working resources
- Language barriers and cultural differences
- Difference of time zone between teams

4.2 Trust challenges in Project Management

The main findings were the following

- Lack of Team Interconnection
- Bad socializing culture
- Lack of face to face meetings
- Miss commitments

4.3 Summarization of our Interviews and Discussion on Results.

Question 1: When multiple teams are working together, there is a possibility that the political obstacles can be created and carried out by some of the political players. How can you identify the political players and what steps do you take to gain their confidence and buy-in on project goals in order to eliminate the political barriers to achieve the project goals?

Discussion based on Interviews and Literature:

According to Literature [57] [58]. The main elements involved in software process improvements are processes definition, appraisal, and process deployment. And organization politics is one of

the main barriers in software process improvement. Because SPI is the main change in organization and people oppose changes, in results they create political environment. Different resources in employees in organization have different interest, goals and skills, so these things sometimes create political environment in organization that everyone is concerned about their own goals and interests. If project manager aligns organization goals with employee goals then this political environment can be reduced. Sometimes Project managers try to eliminate political barriers by escalating political problems up the hierarchy, but this is sometime counterproductive, but literature and interviews we can conclude that align organization goal with employee goal and dealing everything with proper communication, tact and finesse is the key [59][60].

Respondent 1:

"The bigger the organization the bigger the issue", Personal Goals to achieve that might be interfiled by the bigger picture. It's about being able to work with the greater Good, to have common goals. It is easier to identify the political goals each one has in terms of identifying the interest, in terms of benefits etc. that needs to be identified by having an open dialog with everyone at the same time understanding that how someone personal goal might affect the department or the job. Otherwise you need to face the reluctance and you don't know what is reluctant in your goals. It always resolves by spending time with different departments.

Respondent 2:

When it comes to employee, they have different interest, personal goals etc. that might affect their work. It is wise to collaborate with each and every one and identify their interest and personal goals that might affect the job they are doing or not and finding a common solution to get most out of the person either by changing the task, close monitoring or by using someone else for the same task. Because personal goal might affect the company in achieving the main goals.

Respondent 3:

It comes at the individual levels, based on the persons interest and personal goals, If it is in opposite direction to the personal goals that might create barriers in achieving something so it is always better for the team leads to spend time with employees and identify their personal goals so that will help him to distribute tasks based on their interest and have a control that personal interest should not affect the business activity.

Question 2: How do you handle communication among teams if mistrust and chaos are created among them?

Discussion based on Interviews and Literature:

According to [61[[62] Projects in which large development is involved are not very much time bound, so more the development the more communication is involved and sometime there might be miss communication that leads to lack of trust among resources. The Key factor that we have studied from literatures are given below:

1. Poor socialization
2. socio culture fit
3. bad work practices,
4. Increased monitoring on employees
5. Reduction of unpredictability in communication
6. Conflict handling
7. Cognitive based trust

So, the solution of this problem is to avoid these above-mentioned problems in order to create sense of trust in company

Respondent 1

By creating understanding for all the arguments, It's all about Dialog, Dialog and Dialog. Informing each party impact of the different solution and the response from the other side.
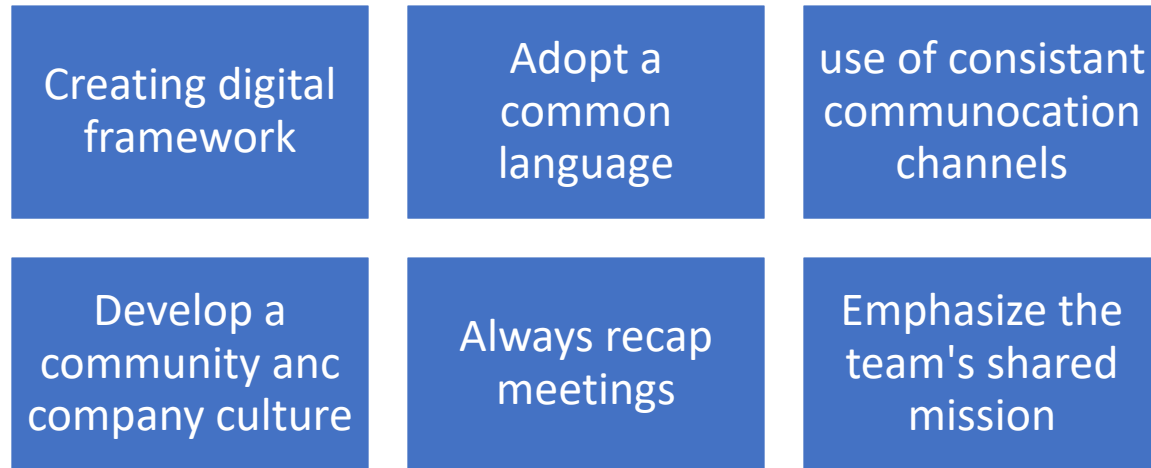
Respondent 2:

It is all about communication. It is important to find out the problem and then looking into the impact on business and then sitting with both parties collectively or individually to sort out the problem.

Question 3: How could you ensure effective communication among organizations or remotely distributed teams if they have organizational or cultural differences?

Discussion based on Interviews and Literature:

According to [63] [64] [65] I have concluded below mentioned points

Creating digital framework	Adopt a common language	use of consistant communocation channels
Develop a community anc company culture	Always recap meetings	Emphasize the team's shared mission

Respondent 1:

It's about having one lead; one lead is needed on all the project who controls and have the final say. If the project is same for all the countries. To be an effective organization we cannot have democracy all the way through, we have to have one who takes the decisions. We can say that in a meeting all the ideas and thoughts are allowed but when it comes to the decision it should be taken by one. But as soon as we involve different project leaders or task leaders or team leaders that have strong positions that have their own goals and path it is seldom that we reach at the decision in a single meeting. So, it can be done in different takes (meetings) and then comping up with the final decision and involving all the parties.

Respondent 2:

It is by following the hierarchal structure with in the organization, all information or communication should be carried by the lead/manager of the team and the decision authority should be maintained. Also, it involves the personal interest of the team/department that might conflict with the other team/department that will take time to find out the common interests that is needed to achieve the business targets.

Respondent 3:

We face this issue almost on daily basis as we have teams working globally with us and the in-house teams. So, I usually prefer to talk with the lead instead of involving every one directly, because it is easy to communicate with lead and agree. The lead then communicates with the whole team based on their understanding levels and will answer their questions.

The same goes for the decisions from lead's communication with team and taking the final decision, and then he delivers the information to me in a summarized way involving all parties.

Question 4: Often when specialists from different disciplines get together to discuss project related matters, there is a tendency for each side to make assumptions (often tacitly) regarding a common understanding of specialized jargon. How do you identify the specialized terminology used by different disciplines such as accounting, IT, marketing etc.?

Discussion based on Interviews and Literature:

As also mentioned by our respondents that the problem is people think they understand but they don't and the best thing is to google or to ask to clear the thing. There is a need to use more effective language instead of using wide terms etc. one of the problems is that sometimes people ate just nodding their heads when I reality they are not understanding jargons in their communication. The key of best and effective communication that common ground must be established between parties. The fundamental is to use the right words for the right audience in an environment that encourages others to press for clarity when the language is unclear. [89]

Respondent 1:

This is the problem that we have within our organization because we use different terminology and we assume that everyone understands. The problem is people think they understand but they don't and the best thing is to google or to ask to clear the thing. There is a need to use more effective language instead of using wide terms etc. To gain upper hand on the party as a way of intimidating others by using a language to create a barrier among you and others as a way of saying that we are smarter than you are. We should use normal language for all by using the everyday language. It's a question about US and THEM that's why it's a problem between organizations

and businesses, is basically understanding the code and the terms while others don't understand what they are talking about.

Respondent 2:

This is a common problem among most of the organizations and especially if there is a language or cultural differences. The simplest thing to do is to use the common language with easy words so everyone can understand. It is also wise to include relevant examples from natural life as an analogy so people can understand what exactly you wanted to say. It is also a problem that people think that they understood but they did not because of the cultural differences and personal attitude.

Respondent 3:

As a CTO I have the responsibility to communicate in all the verticals having different disciplines, niche and understanding levels. For example, an accountant does not understand the technical things etc. So, I prefer to use the simple English words and short sentences to deliver information what is supposed to be delivered like you can say what is achieved and what's the future achievement you are looking for instead of how you did something.

Question 5: How do you evaluate the abilities of the project team to either: a) determine if appropriate competency exist to fulfill the communication requirements or b) if training will be required for the project team?

Discussion based on Interviews and Literature:

According to [86][87][88] following are the key measure to identify that if trainings are required

Set clear expectations	Monitor performance	Ask Away
Setup Personal Development Plans	Settingup a focus group	Setting up a System of mentoring and coaching
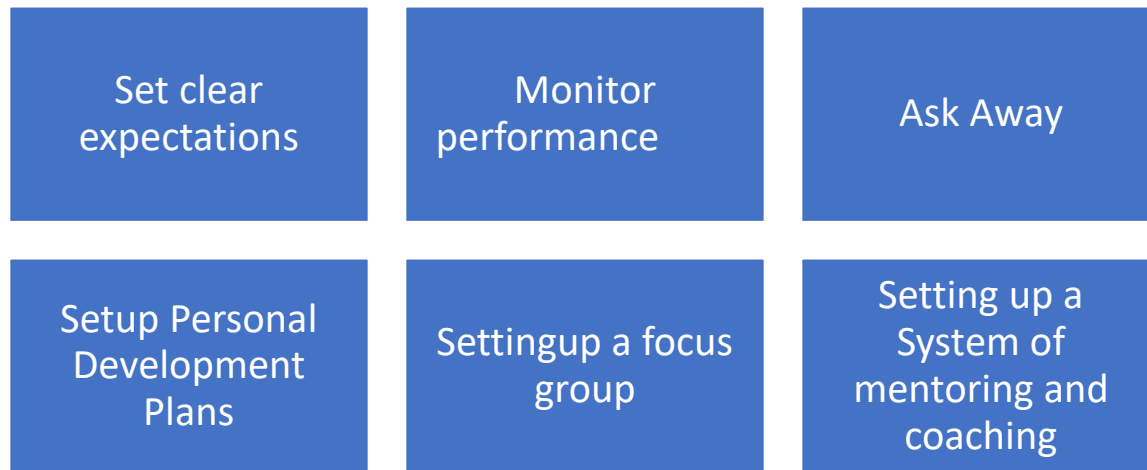
Respondent 1:

We seldom have actual trainings as schooling, it is done within the organization while practicing your job, it is important that your leader needs to have communication with you regarding your strengths as weaknesses. It is required that you have the base communication skills and abilities and they can be identified by the communication.

Respondent 2:

We believe that people learn with experience and guidance. The leader should understand the strength and weakness of their team mates and help them in improving it. Also, at the same time it is required that the person should have base level of skills because work environment is not a school.

Respondent 3:

Every organization have some style of communication and attitude towards working with customers and colleagues. Everyone at professional positions have their own style so it is better to sit and have a talk and convey what style we follow in communication in this organization so everyone will get into the comfortable zone. Also, there are many things that employee adopts or improves with experience.

Question 6: How did you share important information or urgent issues among teams to ensure that the information is received and perceived correctly?

Discussion based on Interviews and Literature:

According to literature [79] [80] key points are discussed to control flow of information are Build spaces for knowledge sharing i.e. conference rooms, casual meetings, enable multiple channels i.e. face-face collaboration and schedule offsite events and meetings to increase knowledge sharing within company.

As a lead you might be thinking of the 15 different rationales while the person you are speaking with might be thinking of only 2 among them and they will answer based on that only. For example within an organization even on a common goal, different leaders will have different perspective based on their need and this will be resolved by gathering all the parties to sit down and discuss and then leave them so they can agree on the common solution by understanding the objectives of the others for example operational lead will have concerns related to day to day operations and that might differ from the concerns of the CEO or IT

Respondent 1:

When it comes to communication the sender is responsible that the information is perceived correctly. Often you say that I gave the information but it doesn't mean that receiver gets the information what you have communicated. The easiest part is spoken communication because it is easier to read the speakers message. It seems to be impossible to ensure that information is delivered correctly

The easiest thing is to ask the recipient to get back to you with the short answer on how you understand the communication. If it's a project it is sometimes the sender requires something from the receiver let say data and most of the time sender uses his experience and identifies that the data is incorrect and then sender understands that receiver didn't have that correctly. Normally, you receive a partially communication that tells that you are on a wring track. You need to have the person who identifies the information.

The more thing is instead of giving them the task give them the problem to see if they are inclined with you or ask as a question, we have this situation this is how we are thinking, what do you think how this will affect? And you will see how they understand the main thing is to include the problem and the reason behind what you ask for this will give the opportunity to think in a different way for solution A instead of solution B. Then they will come back and say how we understand.

As a lead you might be thinking of the 15 different rationales while the person you are speaking with might be thinking of only 2 among them and they will answer based on that only. For example within an organization even on a common goal, different leaders will have different perspective based on their need and this will be resolved by gathering all the parties to sit down and discuss and then leave them so they can agree on the common solution by understanding the objectives of the others for example operational lead will have concerns related to day to day operations and that might differ from the concerns of the CEO or IT

Respondent 2:

If this is by email then it is the responsibility of an employee to ask their team lead if he/she did not understand it same for the lead to ensure everyone gets the information correctly. It also depends upon the importance of the email If it is quite critical you can ask for the reply with their understanding. I believe that the leads play a vital role in communication throughout the organization when you have multiple teams to ensure the information flow is received and perceived correctly. Also, how the information is understood varies from work disciplines from example CEO said something from business point of view that might be taken negative by the accountant point or software engineer's point of view. So, the leader has to think for both verticals and make his team understand what is exactly said.

Respondent 3:

I prefer to do video conferencing when involving everyone and answering their questions. Sometimes if it is detail oriented then I send an email to everyone to ready first and write their questions before the meeting and in Meeting I try to explain a bit again in a short form and welcome questions that resolves their confusions. On the other hand, for short information I prefer to communicate with the team leads.

Question 7: Which Project Management tools and Communication medium do you use (for communication among teams)?

Discussion based on Interviews and Literature:

Apart from our respondents the methods discussed in [83][84][85] are:

1. Jira software
2. Zoho projects
3. Slack
4. Microsoft teams
5. Cisco WebEx teams
6. Dropbox
7. Google drive
8. One drive
9. Emails
10. Telephonic conversations

Respondent 1:

Email is mostly used for important and official communication whereas with in office Spark or Microsoft Teams is used.

Respondent 2:

Email for high-up. Microsoft Teams for on board teams and skype and Teams for Offshore Teams

Respondent 3:

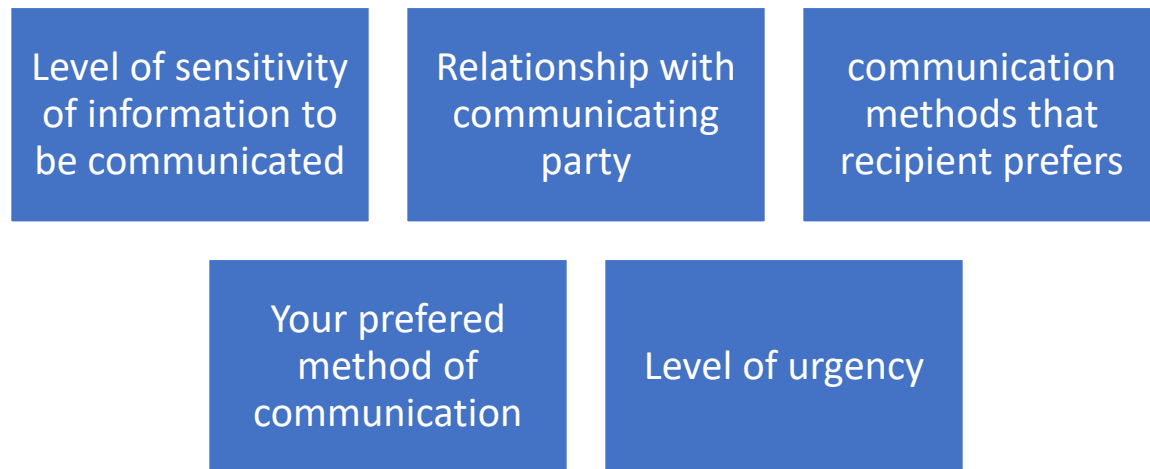Standup meeting, mostly Email and then in groups on Microsoft Teams and Skype

Question 8: On which basis do you decide which communication method you need to use?

Discussion based on Interviews and Literature:

As mentioned above by our respondents that It varies from number of peoples involved, severity of information, relevancy of information and geographical location. According to [79] [77] below

are the points that helps us in deciding our communication method, we can use below mention criteria

Level of sensitivity of information to be communicated	Relationship with communicating party	communication methods that recipient prefers
Your prefered method of communication	Level of urgency	

Respondent 1:

I think you have to see how important it is for you that everyone is aligned, if everyone is included then you need to do the project together by sitting together in a meeting room. It is not required and you are not able to inform everyone. You need to sit and decide which parties should be involved and who will be affected with it. Personally, being in copy on the emails is a hectic task while you are busy with the other things and it is hard to be in line with all the information. You have to trust that you will be asked when a decision is taken in which you need to be involved. Asking people is an easy way of not taking the responsibility, thinking that they have to prioritize and they have to read through it Instead it should be like after the communication instead of sending a summarized email with the decision, It should be sent like this is the issue we had and this is the solution we choose. And it is easier to have updates in the meetings like in conference or in meetings to deliver all the information what you have.

Respondent 2:

It varies from number of peoples involved, severity of information, relevancy of information and geographical location. You need to decide which teams should be involved and which are good to be involved. I personally like to do the meeting involving everyone or by

Email: When some decision or information to be forwarded,

Video conferencing when involving people from global locations.

When it comes to the collective meeting it is important to involve people based on their roles for example multiple teams can conclude something and based on their conclusion, they can involve high-ups with the summarized details to conclude some decision. The important thing is to keep people aligned and to keep the flow clear

Respondent 3:

For communication with everyone in my team: I like to use email when things needed to be formal, but people tend to change email in chat with questions and loses the main topic. So, for discussion-oriented topics, I used to send them an email and invite them to ask questions to their lead and then the remaining one to me through their lead.

For one to one or in groups: I like to use skype groups or video conferencing involving global team leads

Question 9: How do you summarize the information from the teams and deliver it to other stake holders and to the board?

Discussion based on Interviews and Literature:

As mentioned above by our respondents that communication is the key, establish the dedicated key of communication, also gathering all the summarized information from all the teams and conclude summary. As mentioned in [81] [82] that sending presentation, decks and other material before meeting is the effective sometimes, and the main thing is we must know that facts in our metrics, be specific about the meeting goals, take responsibilities, review your strategies, create transparencies and be proactive. The things to avoid in flow of communications are don't provide your audience with too much details, never surprise other with bad news, ignore the dynamics in your surroundings.

Respondent 1:

This is the chain of communication, if you have a team of 8, they all don't have to communicate with me, the decision needs to made and confirmed by the leader of the team or the project and they will inform their leaders. It's a good to make a blind copy to the team as well, so it is ensured that the information is secured and conveyed as well to make them inclined.

Respondent 2:

I gather all the summarized information from all the teams and conclude my summary over it to discuss with the board and other stake holders.
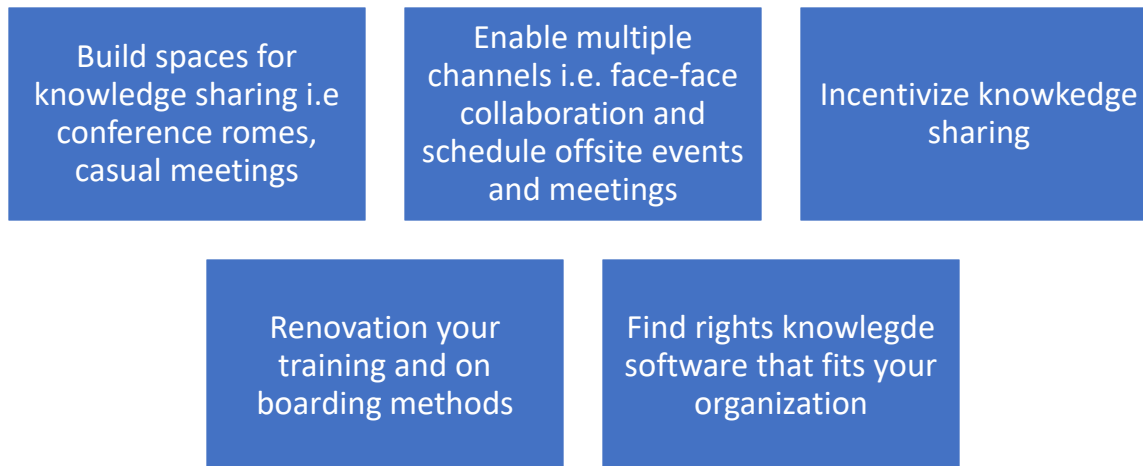
Respondent 3:

It is the sequence of communication either from team lead to their manager or from manager to their Chiefs or board members. The best way is to always gather information from your team leads or managers and then create a summarized short report for the type of meeting with short details of their interest for example the information related to how many goals we have achieved and how far are we is of customer or stakeholders' interest. Whereas for board members they are interested in figures how much we did so far and how much are we targeting from number of customers.

Question 10: How do you control the information flow or knowledge sharing among the teams?

Discussion based on Interviews and Literature:

As also mentioned above by our respondents that it is always advised to keep everyone updated to keep them inclined with the direction of business goals and letting the people to suggest things based on their experience and creative mindset. And Not all the information is for everyone, you need to decide what is needed and what is good to know and the same goes to the leads and managers but information related to company's goal and its' direction is something that on abstract level what everyone needs to know. According to literature [79] [80] following key points are discussed to control flow of information and to increase knowledge sharing within company.

Build spaces for knowledge sharing i.e conference romes, casual meetings	Enable multiple channels i.e. face-face collaboration and schedule offsite events and meetings	Incentivize knowkedge sharing
Renovation your training and on boarding methods	Find rights knowlegde software that fits your organization	

Respondent 1:

This is that you need to know the one that needs the information, if you don't need it is only nice to have it is not important but at some time you need to bring all the team so they can know what we are doing and why we are doing it So, they can do their fragment of it without being involving into what everyone else is doing all the time and I think that is important. When I ask a small task to someone, I always tries to explain the problem and why I need that. That helps the team to understand what was intended and how the piece of my puzzle will fit in.

Respondent 2:

Information flow always depends upon the type of information. The flow is controlled by the leaders like not all the information needed to be delivered to everyone. So, the originating leader should have a say to release the information based on its sensitivity.

It is always advised to keep everyone updated to keep them inclined with the direction of business goals and letting the people to suggest things based on their experience and creative mindset.

Respondent 3:

Not all the information is for everyone, you need to decide what is needed and what is good to know and the same goes to the leads and managers but information related to company's goal and

its' direction is something that on abstract level what everyone needs to know. So, that they feel confident and them self to be a part of the team/company. Employees are the asset of the company and they always want to feel them self as part of something. For me no matter what designation you have the thing that matters is how far you go collectively.

When it comes to the problems the team needs to understand all the parameters so they can come up with various Genius solutions.

Question 11: How do you keep everyone motivated to achieve the common goal through communication?

Discussion based on Interviews and Literature:

As mentioned above by our respondents that keep the team motivated it is required to appreciate in a good way collectively, we can also do by acknowledgment and delivering information how far are we in achieving something, so, they know what they doing is something quite meaningful.

According to [74] [75] [76] [77] we can conclude the following key points to keep everyone motivated to achieve the common goal through communication:

Encourage happiness	Set clear goals	Dont micromanage
Keep the lined open	Frequent feedbacks	Avoid negative communication
Diversity your communication plans	Promote team works	Growth and learning opportunies

Respondent 1:

If I answer without touching the field of motivation, it is like if you be a good example for others, be a decent guy, treat them with respect and acknowledge what they are doing and of course give those updates along the way. One thing that could be mentioned is take the time to celebrate small wins because we forget that often, we only focus on a bigger picture and bigger picture is a never-ending story more or less, there are always new things to be done we seldom stops and celebrates the wins along the way. Wins are the things that gives us confidence and believes on what we are doing. It can be small things like let's go and take a cup of coffee or let's go for 5 mins and just relax.

Respondent 2:

It's a hard thing to answer but to keep the team motivated it is required to appreciate in a good way collectively (not individually). Because in collective appreciation the team members will feel like team and it creates a sense of achievement among them. By taking some time in celebrating things or achievements by gathering together instead of just sending an email like ordering a pizza for every one or inviting every one for a cricket after office hours or even just for chit chat in a break

Respondent 3:

By acknowledgment and delivering information how far are we in achieving something, so, they know what they doing is something quite meaningful. And It will motivate them in putting more effort because they feel that they are a part of something that is going to make an impact. It is good to deliver these kinds of information not by emails but by gathering them together. Along with the business you need to understand the human psyche and benefit of sense of achievement returns.

Question 12: How do you make people listen to and trust you irrespective to the position you have?

Discussion based on Interviews and Literature:

According to Literature [40] trust can be build using the Competence, connection, communication and honesty.

Competence: be capable	**Connection: be empathetic**
Communication: be clear	**Honesty: be reliable**

So, to conclude apart from the above-mentioned parameters you have to be a good person in nature, someone easy to talk with, have personality and sound in decisions.

Respondent 1:

If you don't have the personality. This has a lot to do with your personality, if you remove your position you will left with your personality, your communication skills and of course your competence. If you are very competent you can be asked by the people but if you have competence level but don't have the personality or communication set that makes people not value your opinion. The trust is not only about competence it about something if you have a good personality a good way of communication that's going to sum-up and you are going to ask, And you will see this in any form, in a dynamic group of people, someone asks a question to person2 not to person1 although the question is relevant to person1 because of his experience but they ask it to person 2 just because that guy is more trustworthy kind guy.

Respondent 2:

On basic parameters you have to be a good person in nature, someone easy to talk with, have personality and sound in decisions. People in your surrounding are looking for someone to listen by wearing their shoes and then helping them out with the solution that is best for them.

On competitive parameters: Your skill set and knowledge makes you're differ from a group of people and will let the people trust if you do have the basic parameters.

Respondent 3:

It is all about the personality traits. I think people might listen to you because of the designation but they might not trust you. One should be good in personality and it is not only about dressing, it is a combination of: how keen you are, how easy it is to understand you and how much you listen to them, how valuable are you for them, how do you look etc. This is something that makes you to stand out of them and give weight and trust to your words!

Question 13: What is your approach regarding criticism in the teams to abstain from negative impact on communication and trust?

Discussion based on Interviews and Literature:

As per our respondents that people do things normally but they are might be irritating for others, and in teams we have common issues that people are not happy, they notice how someone talks, how they write, how they look, how they smell, this sometimes create negativity. As multiple concerns in a book [72] are discussed related to establishing positivity within organization, how to remove negativity and how they are affecting our culture. Below is our conclusion related to removing negativity within organization in order to ensure smooth communication and trust within organization [71][72][73]

Make positivity a core value	Write positive Quotes on wall and emails	Talk with people
Provide trust and respect to other	Provide opportunity for growth and empower innovation	Give recognitions
Teach employees to be grateful	Build role models	Gives

Respondent 1:

As soon as you have a team you will have these kinds of issues, people are not happy, how someone talks, how they write, how they look, how they smell, it might be everything. At some point this will reach a level where you have to address it, and when addressing it, it is about tolerance and understanding of others position. When you have an issue, In order to take a decision I tends to talk with both parties one to one, It might be solved by talking one to one with each side or at some point you have it involve them and changing the dialog from you are too I feel or this things. Instead of saying you do this and you do that you can say how it does affects me.

Respondent 2:

It happens in all the teams; people do things normally but they are might be irritating for others. The best thing is to sit and talk and find a reasonable ground to solve a problem but obviously you cannot sit for small things or try to solve everything there should be a tolerance as well.
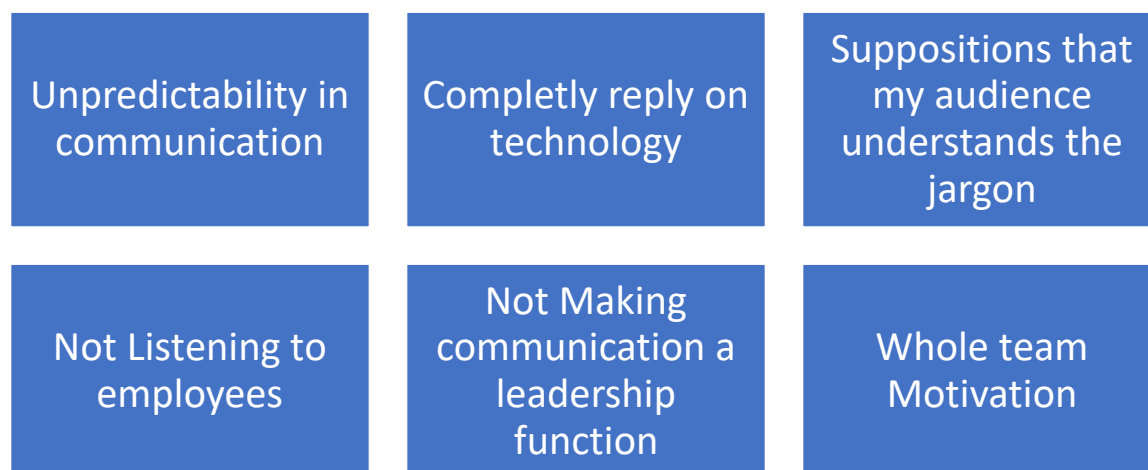
Respondent 3:

Negative impact and criticism are in all the teams, and the organizational culture among managers keeps an important role here. I think when you see an issue you need to look at the artifacts from

both the parties and conclude or come up with something that they both should agree. It Is all about tolerance and understanding the demands or problems and then coming up with something that will have no or less impact on others.

Question 14: What other challenges are you facing regarding communication and trust issues among teams and how are you overcoming these challenges?

Discussion based on Interviews and Literature:

As mentioned by our respondents the main challenge is to convey clear requirements and ensuring everyone is on same page for any kind of task. In trust the main challenge is to build up the trust among employees that you are a decent guy, easy to communicate with and reliable. Sometimes, some people are quite trustable but hard to communicate with. Etc. According to literature [68] [69] [70] Today's Organizations are built on trust and in fact communication is very essential element to build and retain trust. In other words, we can also say that we can use better and effective communication to build trust. Below are the challenges related to better communication and trust in organizations

Unpredictability in communication	Completly reply on technology	Suppositions that my audience understands the jargon
Not Listening to employees	Not Making communication a leadership function	Whole team Motivation

I can conclude that we can overcome these challenges using below mentioned points

1. Boost Moral of employees
2. Motivate your team and demonstrate passion
3. Knowledge sharing
4. Keeping promises with employees
5. Communicate clearly and concisely
6. Listen to other people
7. Ensure multiple mediums of communication i.e. verbal non verbal
8. Build proper communication and trust strategy within company, take feedbacks about your strategies.

Respondent 1:

In communication: The main challenge is to convey clear requirements and ensuring everyone is on same page for any kind of task

In trust the main challenge is to build up the trust among employees that you are a decent guy, easy to communicate with and reliable. Sometimes, some people are quite trustable but hard to communicate with etc.

It's a challenge to identify the strength and capabilities of the employees and to differentiate among the problem

Respondent 2:

We are struggling with communication challenges in team's communication globally you can trust that the person has perceived the information correctly but after couple of days you understand they are thinking in some other directions. So, it is sometimes hard to get them back on the directed path.

Respondent 3:

Specifically, in communication during the flow of information people tend to forget the key points or sometimes they say they got it but they did not. As a result, a whole team gets detracted from one persons (Lead) misunderstanding. Especially in IT, it has a huge impact in terms of time, cost. For example: you have asked for a wooden swing for a customer, but the lead/manager forgets wood and his team has made it with the rubber tire.

Question 15: How is trust developed and retained among teams or organizations?

Discussion based on Interviews and Literature:

As [66] discusses using the data gathered at two phases, and discusses how ethical leadership behavior impacts employees' evaluations of organization focused justice, for example procedural justice and distributive justice. This justice is the key to establish trust in organization. Few of the main key elements [67] to establish trust in organization are mentioned below:

Protect the interests of employees	Act with intergity and keep commitments	Be Honest and supportive

Be consistent	Better communication is the key

Discussion and Solution to challenges faced by Communication and trust in Project management

Considering all the challenges regarding communication and trust issues, the solutions that I suggest is discussed below.

It varies from team to team locally or globally and based on cultures as well. You need to understand to whom you are talking with their level of understanding with you because you cannot by pass and communicate with the team all the time. It is his job. So, you need to ensure he understood correctly by asking him questions after the briefing. You can trust him but not a blind trust that will never solves the problem. It is all about communication, the major problem in the

organizations is that the leaders do not find time to sit with their team mates to identify the problems or things bothering them at the same time based on the geographical locations their attitude towards work is different than the others. They have to be kind and courageous to listen and pamper the other persons or to come up with the solution for them.

Respondent 1:

With effective communication trust will be developed, by keeping everyone one inclined and keeping goals and information clear. By being a good example for others in your work etc.

I think trust is one thing, I think you can have blind trust but big issues, but I think trust is important as the base but trust doesn't delete your problems it makes them easier to fix but you as a leader even if you have a trust from all the employees you will have a problems within the group but it is easier to solve if you have trust among employees that you are a decent guy.

Respondent 2:

It is all about communication. By keeping everyone one inclined and keeping goals and information clear. By being a good example for others in your work etc.

Respondent 3:

There are many ways but the main thing is the person's personality and communication style. And how much respect he gives to the others. Because you will get what you give.

5 Conclusion

In this thesis I have discussed multiple problems and discussion on these problems in large scale agile project management related to communication and trust. As I have also discussed in my findings section that misunderstandings and delayed feedbacks in communication lead towards trust issues among employees. Communication and trust issues are interrelated, for instance; poor socializing, lack of team interconnection, and lack of commitments also leads towards trust issues. These trust issues create complications, poor performance of employees and delayed feedbacks of work. The solutions to deal with communication and trust issues is to improve communication, do as frequent visits, fulfill commitments, provide good and helping work environment. As trust and communication is a two-way road, doing trust helps build trust on other side too. After all this research I can state this that no communication in project management can be successful without presence of trust among parties.

Solutions for good, fast and accurate communication is to address language, cultural issues, do meetups and face to face meeting. If face to face meeting is not possible, prefer video conferencing. It varies from team to team, locally or globally and based on cultures as well. You need to understand that whom you are talking to. You must come to the level of understanding of other party. So, you need to ensure he/she understand correctly by asking him/her questions after briefing. You can trust him/her but not a blind trust that will never solves the problem. It is all about communication, the major problem in the organizations is that the leaders do not find time to sit with their team mates to identify the problems or things bothering them at the same time based on the geographical locations their attitude towards work is different than the others. They have to be kind and courageous to listen and pamper the other persons or to come up with the solution for them. You must be honest and supportive, act with integrity and keep commitments with other in order to do better communication, because trust building is all about healthy communication.

To conclude communication and trust in large scale agile project management we can say that It is about dialog and understanding that a lot of people when they have a problem; they have a problem with others and you have to understand that, you are a problem solver, and you should come up with the solution or it tends to be the other way around. If I have a problem, I need to fix

it for me. As you can't choose your colleagues, your family and your coworkers. It is not your choice that whom you are not going to work with. I think the one having the problem or coming up with the problem might have the problem more then they think, as overthinking create problems too. You need to solve it by communication and you need understand that it needs to be solved, and trust is the key and major element in communication. No communication can be successful and fruitful if there is lack of trust among both parties, and in my case I have addressed the problem of communication and trust issues in large scale project management, large scale organizations have huge issues and huge issues need more communication to solve these issues on permanent basic and at that point trust is like oxygen in air, no oxygen in air mean we cannot breath properly similarly no trust in communication means bad communication. It must be there to make effective communication.

6 Limitations and Future Work

6.1 Limitations

At start of my thesis my goal was to find communication and trust issues in project management but after doing literature review, I came to the point that issue of communication and trust in large scale project management is not discussed in detail in literature. So, I changed focus of my thesis to this topic, another limitation was there was a smaller number of respondents available for these interviews.

6.2 Future Work

This thesis discussed communication and trust issues in companies following agile technique, and we discussed these issues from current environment as well as from literature research. The Aspect of ensuring self-trust and self-understanding within a resource is not discussed in this research. It might be an interesting research to investigate how to ensure self-trust and self-understanding in a resource.

References

1. Hussein, B. Categorization of Project Success Factors According to Project Characteristics Insights from 21 project cases from Norway.

2. A qualitative study of success criteria in Norwegian agile software projects from suppliers' perspective.
   International Journal of Information Systems and Project Management, 01 January 2016, Vol.4(2), pp.63-79

3. Dingsøyr, Torgeir, Tore Dybå, and Nils Brede Moe, eds., *Agile Software Development: Current Research and Future Directions* (Berlin: Springer, 2010)

4. Williams, L., & Cockburn, A. (2003). Guest Editors' Introduction: Agile Software Development: It's about Feedback and Change. *Computer*, *36*(6), 39-43.

5. Schwaber, K. (2004). *Agile project management with Scrum*. Microsoft press.

6. Agile Menifesto - https://www.agilealliance.org/agile101/the-agile-manifesto/

7. Master Thesis - Rising, L. and N. S. Janoff (2000). The scrum software development process for small teams. IEEE software 17 (4), 26.

8. Sridhar Nerur and VenuGopal Balijepally. Theoretical reflections on agile development methodologies. Communications of the ACM, 50(3):79–83, 2007.

9. Sridhar Nerur, RadhaKanta Mahapatra, and George Mangalaraj. Challenges of migrating to agile methodologies. Communications of the ACM, 48(5):72–78, 2005.

10. https://project-management.com/7-challenges-and-solutions-in-managing-large-scale-it-projects/

11. Torgeir Dingsøyr, Sridhar Nerur, VenuGopal Balijepally, and Nils Brede Moe. A decade of agile methodologies: Towards explaining agile software development. Journal of Systems and Software, 85(6):1213–1221, 2012.

12. Nerur, S., R. Mahapatra, and G. Mangalaraj (2005). Challenges of migrating to agile methodologies. Communications of the ACM 48 (5), 72–78.

13. Dikert, K., M. Paasivaara, and C. Lassenius (2016). Challenges and success factors for large-scale agile transformations: A systematic literature review. Journal of Systems and Software.

14. Highsmith, J. A. (2002). Agile software development ecosystems, Volume 13. Addison-Wesley Professional.

15. Pedro Serrador and Jeffrey K Pinto. Does agile work?—a quantitative analysis of agile project success. International Journal of Project Management, 33(5):1040–1051, 2015.

16. Gwanhoo Lee and Weidong Xia. Toward agile: an integrated analysis of quantitative and qualitative field data on software development agility. Mis Quarterly, 34(1):87–114, 2010.

17. Dybå, T. and T. Dingsøyr (2008). Empirical studies of agile software development: A systematic review. Information and software technology 50 (9), 833–859.

18. Bass, J. M. and Ieee (2014) Scrum Master Activities: Process Tailoring in Large Enterprise Projects 2014 Ieee 9th International Conference on Global Software Engineering. New York: Ieee, pp. 6-15.

19. Scrum.org (Assessed on 02 Feb, 2018) - https://www.scrum.org/resources/what-is-scrum

20. Lindsay Ratcli.e and Marc McNeill. 2012. Agile experience design: A Digital Designer's Guide to Agile, Lean, and Continuous.

21. Nils Brede Moe , Torgeir Dingsøyr , Tore Dybå, A teamwork model for understanding an agile team: A case study of a Scrum project, Information and Software Technology, v.52 n.5, p.480-491, May, 2010

22. Rost, J., 'Political Reasons for Failed Software Projects', IEEE Software, 21.6 (2004) - https://doi.org/10.1109/MS.2004.48

23. Reina, Dennis S. and Michelle L. Reina. *Trust & Betrayal in the Workplace: Building Effective Relationships in Your Organization*. 3rd edition. Oakland: Berrett-Koehler Publishers, 2015

24. McHugh, Orla, Kieran Conboy, and Michael Lang. "Agile practices: The impact on trust in software project teams." *Ieee Software* 29, no. 3 (2012): 71-76.

25. Moe, Nils Brede, and Darja Šmite. "Understanding a lack of trust in Global Software Teams: a multiple-case study." *Software Process: Improvement and Practice* 13, no. 3 (2008): 217-231.

26. Dorairaj, Siva, James Noble, and Petra Malik. "Effective communication in distributed Agile software development teams." In *International Conference on Agile Software Development*, pp. 102-116. Springer, Berlin, Heidelberg, 2011.

27. Dirks, Kurt T., and Donald L. Ferrin. "The role of trust in organizational settings." *Organization science* 12, no. 4 (2001): 450-467.

28. Korkala, Mikko, and Pekka Abrahamsson. "Communication in distributed agile development: A case study." In *33rd EUROMICRO Conference on Software Engineering and Advanced Applications (EUROMICRO 2007)*, pp. 203-210. IEEE, 2007.

29. Cornelissen, J.P., 2008. Corporate communication. *The International Encyclopedia of Communication*.

30. Littlejohn, Stephen W., and Karen A. Foss. *Encyclopedia of communication theory*. Vol. 1. Sage, 2009.

31. Craig, Robert T. "Communication as a field and discipline." *The international encyclopedia of communication* (2008).

32. https://trifinlabs.com/communication-in-agile/

33. http://www.agilemodeling.com/essays/communication.htm

34. https://www.proofhub.com/articles/project-management-challenges

35. Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and organization*, *17*(1), 2-26.

36. Zhang, Y., & Wildemuth, B. M. Unstructured interviews, 1-10.

37. Longhurst, R. (2003). Semi-structured interviews and focus groups. *Key methods in geography*, 117-132.

38. McLellan, E., MacQueen, K. M., & Neidig, J. L. (2003). Beyond the qualitative interview: Data preparation and transcription. *Field methods*, *15*(1), 63-84.

39. Patton, Michael Quinn. "Two decades of developments in qualitative inquiry: A personal, experiential perspective." *Qualitative social work* 1, no. 3 (2002): 261-283.

40. https://www.projectmanager.com/training/how-to-build-trust-on-teams

41. Powar. Amanpreet Kaur (2017). Challenges in Global Agile Software Development. Department of Informatics, University of Oslo.

42. Goodman, Leo A. "Snowball Sampling." *The Annals of Mathematical Statistics* 32, no. 1 (1961): 148-70. www.jstor.org/stable/2237615.

43. Kaplan, B., & Maxwell, J. A. (2005). Qualitative research methods for evaluating computer information systems. In *Evaluating the organizational impact of healthcare information systems* (pp. 30-55). Springer New York.

44. Cohen, David, Mikael Lindvall, and Patricia Costa. "Agile Software Development," n.d., 64.

45. Rocco, E. (1998, January). Trust breaks down in electronic contexts but can be repaired by some initial face-to-face contact. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 496-502). ACM Press/Addison-Wesley Publishing Co..

46. Kiel, L., & Eng, P. (2003, May). Experiences in distributed development: a case study. In *International Workshop on Global Software Development at ICSE* (pp. 44-47).

47. Piccoli, G., & Ives, B. (2003). Trust and the unintended effects of behavior control in virtual teams. *MIS quarterly*, 365-395.

48. Levy, M., & Hazzan, O. (2009, May). Knowledge management in practice: The case of agile software development. In *Cooperative and Human Aspects on Software Engineering, 2009. CHASE'09. ICSE Workshop on* (pp. 60-65). IEEE.

49. Moe, N. B., Aurum, A., & Dybå, T. (2012). Challenges of shared decision-making: A multiple case study of agile software development. *Information and Software Technology*, *54*(8), 853-865.

50. Melo, C. D. O., Cruzes, D. S., Kon, F., & Conradi, R. (2013). Interpretative case studies on agile team productivity and management. *Information and Software Technology*, *55*(2), 412-427.

51. N. B. Ruparelia, "Software development lifecycle models," vol. 35, no. 3, p. 6, 2010.

52. "A-reusable-software-component-based-development-process-model.pdf." .

53. "SDLC - Waterfall Model - Tutorialspoint." [Online]. Available: https://www.tutorialspoint.com/sdlc/sdlc_waterfall_model.htm. [Accessed: 16-Oct-2019].

54. Mishra, Anshu (2015). *Explore Comparative Analysis Software Development Life Cycle Models*, n.d.

55. "SDLC - Spiral Model - Tutorialspoint." [Online]. Available: https://www.tutorialspoint.com/sdlc/sdlc_spiral_model.htm. [Accessed: 16-Oct-2019].

56. Spiral Model - https://en.wikipedia.org/wiki/Spiral_model

57. Niazi, Mahmood, Muhammad Ali Babar, and June M. Verner. "Software Process Improvement barriers: A cross-cultural comparison." *Information and software technology* 52, no. 11 (2010): 1204-1216.

58. Khan, Siffat Ullah, Mahmood Niazi, and Rashid Ahmad. "Barriers in the selection of offshore software development outsourcing vendors: An exploratory study using a systematic literature review." *Information and Software Technology* 53, no. 7 (2011): 693-706.

59. https://www.bizmanualz.com/better-project-management/how-to-reduce-barriers-to-project-implementation.html

60. https://www.projectsmart.co.uk/obstacles-to-project-communication.php

61. Moe, Nils Brede, and Darja Šmite. "Understanding a lack of trust in Global Software Teams: a multiple-case study." *Software Process: Improvement and Practice* 13, no. 3 (2008): 217-231.

62. Jarvenpaa, Sirkka L., and Dorothy E. Leidner. "Communication and trust in global virtual teams." *Journal of computer-mediated communication* 3, no. 4 (1998): JCMC346.

63. Daim, Tugrul U., Anita Ha, Shawn Reutiman, Brennan Hughes, Ujjal Pathak, Wayne Bynum, and Ashok Bhatla. "Exploring the communication breakdown in global virtual teams." *International Journal of Project Management* 30, no. 2 (2012): 199-212.

64. https://www.entrepreneur.com/article/340977

65. https://remote.co/how-to-manage-cultural-differences-in-remote-work/

66. Xu, Angela J., Raymond Loi, and Hang-yue Ngo. "Ethical leadership behavior and employee justice perceptions: The mediating role of trust in organization." *Journal of Business Ethics* 134, no. 3 (2016): 493-504.

67. https://www.yourthoughtpartner.com/blog/bid/59619/leaders-follow-these-6-steps-to-build-trust-with-employees-improve-how-you-re-perceived

68. Hacker, Janine Viol, Michael Johnson, Carol Saunders, and Amanda L. Thayer. "Trust in Virtual Teams: A Multidisciplinary Review and Integration." *Australasian Journal of Information Systems* 23 (2019).

69. Kauffmann, David, and Golan Carmi. "Knowledge Sharing of Virtual Teams: The Mediating Effect of Trust on Relationship Communication." In *Proceedings of the 8th*

International Conference on Information Communication and Management, pp. 84-89. ACM, 2018.

70. https://bigpicture-learning.com/challenges-to-effective-communication-in-the-workplace/

71. Thomas, Nobin, and Sonakshi Gupta. "Organizational cynicism–what every manager needs to know." *Development and Learning in Organizations: An International Journal* 32, no. 2 (2018): 16-19.

72. Gordon, Jon. *The Power of Positive Leadership: How and why Positive Leaders Transform Teams and Organizations and Change the World*. John Wiley & Sons, 2017.

73. https://addicted2success.com/success-advice/5-ways-to-remove-negativity-in-the-workplace/

74. Quirke, Bill. *Making the connections: using internal communication to turn strategy into action*. Routledge, 2017.

75. Greif, Michel. *The visual factory: building participation through shared information*. Routledge, 2017.

76. Harris, Thomas E., and John C. Sherblom. *Small group and team communication*. Waveland Press, 2018.

77. Dainton, Marianne, and Elaine D. Zelley. *Applying communication theory for professional life: A practical introduction*. Sage publications, 2017.

78. https://www.inc.com/peter-economy/9-super-effective-ways-to-motivate-your-team.html

79. Ghobadi, Shahla. "What drives knowledge sharing in software development teams: A literature review and classification framework." *Information & Management* 52, no. 1 (2015): 82-97.

80. https://bloomfire.com/blog/522359-5-ways-to-encourage-knowledge-sharing-within-your-organization/

81. https://medium.com/the-product-program/getting-to-effective-stakeholder-communication-d3ecd3d6eda

82. Marchewka, Jack T. *Information technology project management: Providing measurable organizational value*. John Wiley & Sons, 2016.

83. Samáková, Jana, Dagmar Babčanová, Henrieta Hrablikchovanová, Jana Mesárošová, and Jana Šujanová. "Using the Communication Methods, Tools and Support During Management of Project Communication in Industrial Manufacturing Enterprises."

Research Papers Faculty of Materials Science and Technology Slovak University of Technology 25, no. 41 (2017): 51-62.

84. Radujković, Mladen, and Mariela Sjekavica. "Project management success factors." *Procedia engineering* 196 (2017): 607-615.

85. https://tech.co/news/enhancing-project-management-communication-2016-12

Appendix

Interview Questionnaire

The questions below are related to communication and trust, in relation to management point of view based on the reader's experience, that will not involve any confidential information to be shared. The identity of the company and the reader will be kept confidential nor it will be used in the thesis, neither it will be published or shared.

Starting of Interview

1. Company Name:
2. Designation:
3. Experience and Expert at
4. Team or Departments you are managing
   a. Departments under management?
   b. No of members in each time
   c. Does all teams/departments work on the same domain
5. what's the structure of your organization (hierarchal or Flat)?
6. How do you see the employees as an employee, colleague or team member?
7. Being at your position how to do think helping your team mates (at any level)?

General Questions

5. What is your communication style with employees?
6. How will you ensure that there are no communication gaps between you and the team you are managing?
7. How will you ensure that your team is comfortable talking to you about any toxic problems they're facing?
8. How do you team up resources and manage sense of trust among them?

Key Questions Regarding to Communication and Trust

1. When multiple teams are working together, there is the possibility that the political obstacles can be created and carried out by some of the political players. How could you identify them and What steps do you take to gain their confidence and buy-in on project goals. To eliminate the political barriers to project goals.

2. How do you handle communication among teams if sense of mistrust and chaos is created among them?

3. How could you ensure effective communication among organizations or remotely distributed teams having organizational Cultural differences (not from countries)?

4. How do you identify the linguistic needs in the sense of specialized terminology used by different disciplines such as accounting, IT, marketing etc.? Often when specialists from diverse areas get together to discuss project related matters, there is a tendency for each side to make assumptions (often tacitly) regarding a common understanding of specialized jargon.

5. How do you evaluate the abilities of the project team to determine if appropriate levels of competency exist to fulfill the communication requirements or if training will be required for the project team?

6. How did you escalate important information or urgent issues among teams to ensure that the information conveyed is received and perceived correctly?

7. Which Project Management tools and Communication medium do you use (for communication among teams)?

8. What communication medium proves best for you for example communication via email, messages (through immediate managers), one to one meetings or Standup meeting with everyone. And on which basis you decide which communication method you need to use?

9. How did you increase the efficiency of communication (via email) among teams and stakeholders, do you have any guidelines for that?

10. What do you think how trust is develop and retained among teams or organizations?

11. How do you handle information gathering and its delivery from your team to the stake holders and high-up's (above designations)?

12. How did you control the information flow or knowledge sharing among the teams?

13. How do you keep everyone motivated to achieve the common goal through communication?

14. What are your attributes that help others in listening you and understanding you irrespective to the designation you have (means why people should listen you or trust you)?

15. Considering all the above problems regarding communication and trust issues, what solutions do you suggest?

Ending Questions

3. What other challenges are you facing regarding communication and trust issues among teams? And how are you overcoming these challenges?

4. In case of any confusion after this interview, can I contact you for more questions?